Headquarters U.S. Air Force

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A Status Report – Progress and Plans for Improving DoD Acquisition by Restoring the Use of Systems Engineering Standard Practices

2012 NDIA Systems Engineering Conference, 24 Oct 12

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The Focus

- Review: types of standards and the AF need
- Restoring standard practices: DoD strategy and progress to date
- The way ahead

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Types of Defense Standards*

- Interface standards: physical, functional, or military operational environment interface characteristics of systems, subsystems, equipment, assemblies, components, items, or parts.
- Design criteria standards: military-unique design or functional criteria (required) in the development of systems, subsystems, equipment, assemblies, components, items, or parts.
- Test method standards: the procedures or criteria for measuring, identifying, or evaluating qualities, characteristics, performance, and properties of a product or process.
- Manufacturing process standards: the desired outcome of a manufacturing process or specific procedures or criteria on how to perform a manufacturing process. (highly discouraged)
- Standard practices: procedures on how to conduct non-manufacturing functions that, at least some of the time, are obtained via contract from private sector firms. * MIL-STD-962D(C1)

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Need for SE Standard Practices - AF Experience

- **2003 – SMC Specs & Standards Revitalization**
  - **Driven by production and on-orbit anomalies post-1995**
  - ***45% of all satellites experienced one or more mission critical failures***
  - ***Root cause analysis: loss of SE discipline in program execution***
- **2004 – AF Inspection Agency Report on Mechanical System Integrity policy compliance**
  - **Policy-required tasks in MIL-HDBK not recognized**
  - ***MIL-HDBK considered as guidance-only by MAJCOM, Center, and SPO leadership***
- **2006 - NDIA SE Division Task Group Report, Top Systems Engineering Issues in US Defense Industry**
  - ***#1 Issue: "Key systems engineering practices known to be effective are not consistently applied* across all phases of the program life cycle"**
  - ***Status in 2010: "Institutionalization of practices has shown value when adopted, but adoption tends to be spotty*. Determination of proficiency in applying practices appears to be problematic."**

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Need for SE Standard Practices - AF Experience, Cont'd

- **2008 - Defense Standardization Council (DSC) Reinstatement of MIL-STD-1547, Electronic Parts, Materials, and Processes for Space and Launch Vehicles**
  - ***All space mission critical failures related to management of parts, materials, and processes*** **(PM&P) in space acquisition**
  - ***Most directly related to the cancellation of MIL-STD-1546 and MIL-STD-1547*** **under Acquisition Reform**
- **2009 - ASC/EN 360 Degree Manufacturing and Quality Study**
  - **Response to long list of grounded weapon systems, unhappy customers, numerous independent review teams, cost overruns, supplier quality escapes, and production transition problems**
  - ***Feedback from Manufacturing and Systems Engineering VP level counterparts*** **at major aerospace companies:**
    - **Lack of knowledge and Govt personnel in manufacturing and quality**
    - ***Failure to specify the right deliverables and task requirements in development contracts***

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Need for SE Standard Practices - AF Experience, Cont'd

- **2010 - Industry Feedback on AF Acquisition Processes**
  - **…to AF Team working on improved request for proposal (RFP) preparation guidance. The industry panel found that:**
  - **"*Acquisition reform (loss of Government standards),* competitive pressures, and industry over-reliance on modeling/analysis, *parented a loss of critical systems engineering fundamentals*;**

    and in a consensus opinion"…
  - **"*If the government doesn't require definition of the core practices to mature a product design…then, technical activities (ie fundamental systems engineering practices) are within industry's "trade space" and can be eliminated unilaterally* – very likely to occur with pressures of competition in today's acquisitions"**

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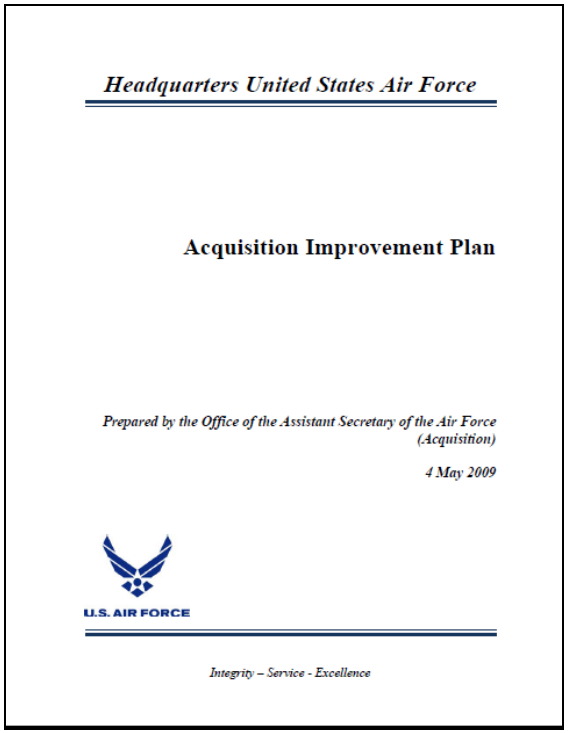
Need for SE Standard Practices - AF Experience, Cont'd

- **2009-2010 - AF Acquisition Improvement Plan (AIP)**
  - **GAO upheld protests of CSAR-X helicopter and KC-X tanker contract awards**
  - **AF leadership directed comprehensive internal look at AF source selection process and assessment of Air Force acquisition as a whole**
  - **Resulting major sub-task "2.1 - Improve the Requirements Generation Process" in part recognized *need to revitalize and institutionalize the standard practices for acquisition program use and common training***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Acquisition Improvement Plan

Prepared by the Office of the Assistant Secretary of the Air Force (Acquisition)

4 May 2009

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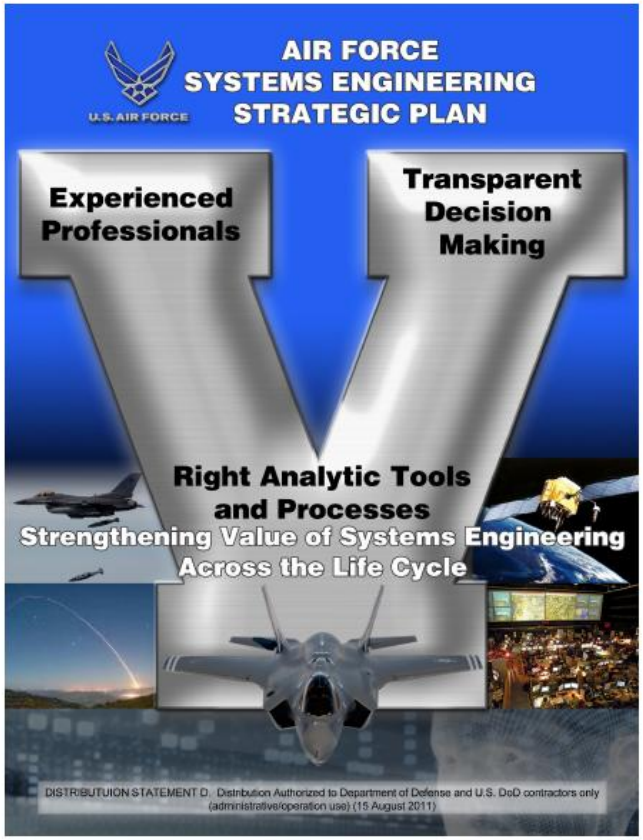
Need for SE Standard Practices - AF Experience, Cont'd

- **2011 – The AF Systems Engineering Strategic Plan**
  - **Goal 2: *Drive efficiency through tailored / flexible standardization* of policy, *processes, practices*, tools, training and metrics**
  - **Objective 2.2. *Revise policy to identify use of standard practices*, tools, and metrics to apply on future contracts**
    - ***Identify and develop/revise a set of standard SE practices (e.g., Configuration Management, Reliability and Maintainability) for use on AF contracts***
    - **Determine other plans, guidance, practices, and processes *to be included in RFPs and as evaluation criteria to drive government desired response from industry***



Gap in Industry Standards – Commercial vs DoD Business Process

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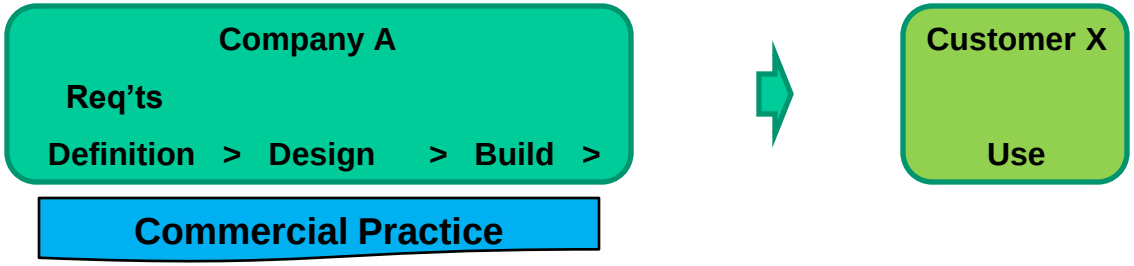
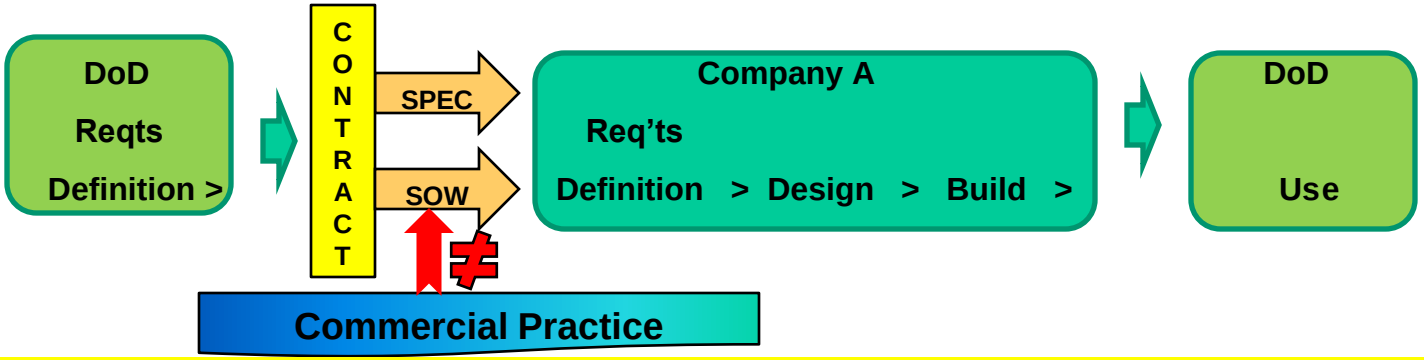
- Every product goes thru life cycle phases of:

  1. Define (requirements) > 2. Design > 3. Build > 4. Use.

- Commercial Business Model to execute this life cycle:



- Typical DoD Business Model to execute this life cycle:



STANDARD USE IS NOT THE SAME – ESPECIALLY IN DoD COST PLUS CONTRACTS

DoD Standard Practices Strategy - Use DSP and Engage DSC

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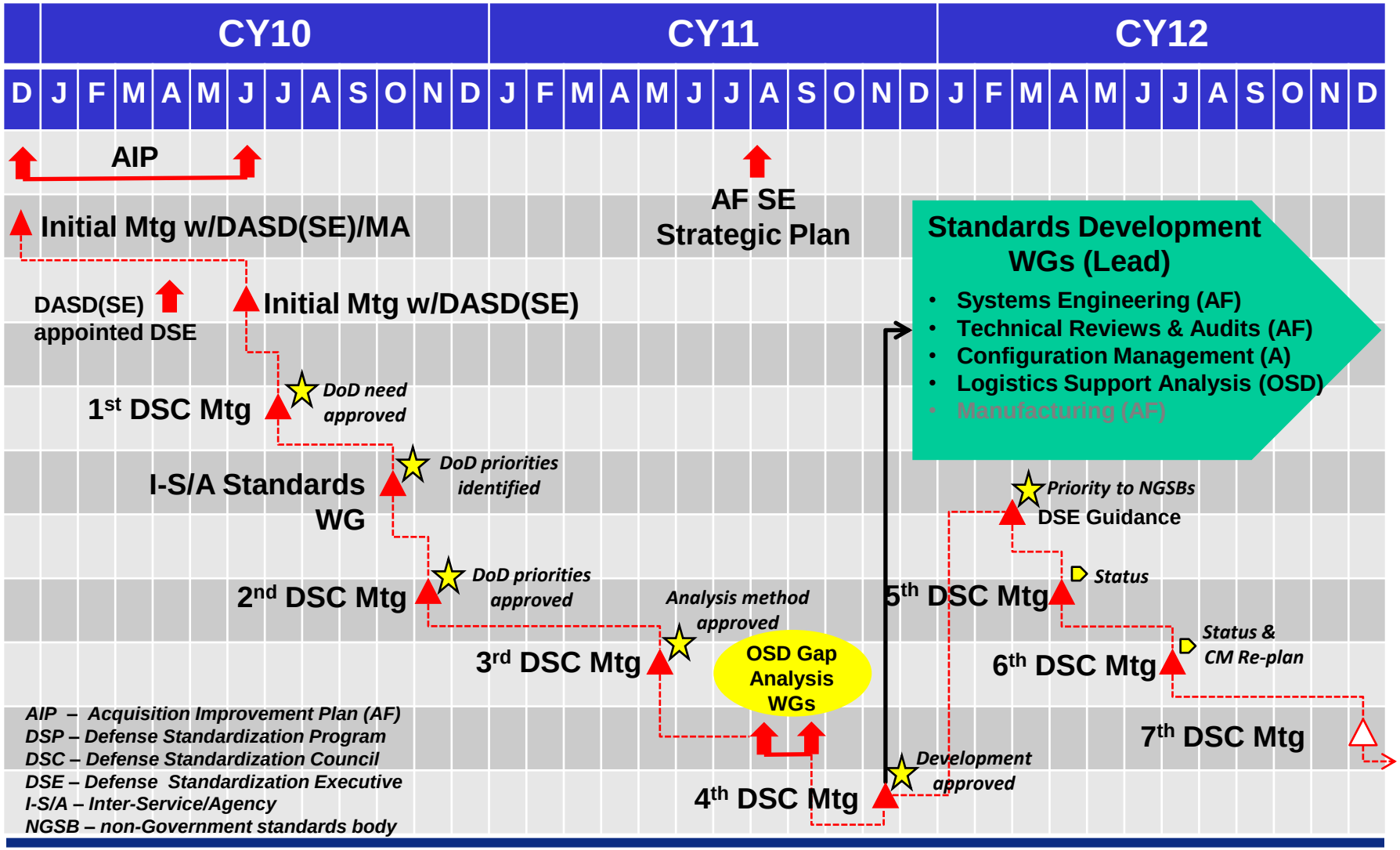

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Status and Way Forward - Standards Development WGs

SYSTEMS ENGINEERING

TECHNICAL REVIEWS AND AUDITS

CONFIGURATION MANAGEMENT*

LOGISTICS SUPPORT ANALYSIS

MEMBERSHIP IN ALL GROUPS: OSD, ARMY, NAVY/*USMC, AF, *DCMA, *DISA

Progress to Date - Systems Engineering and Technical Reviews & Audits WGs

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- **Conducting weekly working groups telecons**
  - **Separate SE and TRA working groups**
  - **Joint meetings due to membership overlap and documents harmonization**
- ✓ **Conducted discussions with industry**
  - **Standards development organizations (SDO): ISO, IEEE, TechAmerica**
  - **Industry representative organizations: NDIA and AIA**
- ✓ **Clarified industry SE standards alignment efforts**
- ✓ **Developed SDO interview questions**
- ✓ **Conducted structured informal SDO interviews**
  - **Coordinated discussions with Configuration Management WG**
  - **Focus on industry SE activities; industry TRA activities are inactive**
- ✓ **Developed SDO "selection criteria"**

Way Ahead - Systems Engineering and Technical Reviews & Audits WGs

- Complete SDO selection - early Nov 2012
- Brief status to DSC – early Dec 2012
- Initiate individual standards development – early Dec 2012
  - Integrate efforts w/CM, LSA and later core SE standards work
- Follow-on efforts needed
  - Revise DIDs for use w/ standards – dates TBD
  - Develop or revise/adopt guidance documents for DoD workforce

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Progress to Date – Configuration Management WG

- ✓ **Army-led initial DoD effort from 2010 – Jul 2012**
  - **Update/revise MIL-STD-973; in coordination with TechAmerica**
    - **Implement ANSI/EIA-STD-649B for DoD direct-cite contract use**
- ✓ **Effort re-planned Jul 2012; two actions underway…**
  - **Army-led development of interim MIL-STD-3046(Army)**
    - **Approved for Army; may be used by other DoD activities**
    - **Cancelled when suitable non-Govt standard developed or after 2 yrs from issuance, and…**
  - **Navy-led development of directly-citable industry standard**
    - **1st priority - Implement ANSI/EIA-STD-649B; in coordination w/TechAmerica**
    - **Next priorities - update/revise CM DIDs and internal DoD CM guidance for workforce**
- **Status**
  - **MIL-STD-3046(ARMY) – in formal DSP coordination via ASSIST**
  - **Directly-citable TA standard: WG re-organized; telecon meetings weekly**

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Way Ahead – Configuration Management WG

- **Interim MIL-STD-3046(ARMY)**
  - **Comment period complete – 17 Oct 2012**
  - **Comment adjudication complete - late Nov 2012**
  - **Brief status to DSC – early Dec 2012**
  - **Document approval – mid Dec 2012**
- **Directly-citable industry standard**
  - **WG plan for DSC approval - TBD**
  - **Brief status to DSC – early Dec 2012**

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Progress to Date – Logistic Support Analysis WG

- ✓ DASD(MR)-led WG explored alternate approaches to contract for Supportability Analyses
  - OSD Supportability Analysis Contracting Guidebook; implement ISO 10303 with…
    - Contract language/requirements and DoD workforce guidance, or…
  - Industry standard for DoD contract requirements; handbook for internal DoD workforce guidance
    - Tech America TA-STD-0017, Product Support Analysis one alternative
    - Updated MIL-HDBK-502, Acquisition Logistics
- Status: WG proposed end-state - industry standard and MIL-HDBK approach

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Way Ahead – Logistics Support Analysis WG

- **Brief proposed approach to Sponsors**
  - **DSC – early Dec 2012**
  - **Product Support Executive Council (PSEC) – TBD**
- **TA-STD-0017**
  - **ANSI review complete– early Nov 2012**
  - **Publish standard (TechAmerica) – mid Nov 2012**
- **MIL-HDBK-502A**
  - **DSP coordination complete – 10 Nov 2012**
  - **Comments adjudication/reconciliation complete – 29 Nov 2012**
  - **Document approval – late Feb 2013**

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Summary

OSD, Military Departments, and Defense Agencies thru DSC remain focused on fixing the engineering process requirements problem…

"If the government doesn't require definition of the core practices to mature a product design…then, technical activities (ie fundamental systems engineering practices) are within industry's "trade space" and can be eliminated unilaterally – very likely to occur with pressures of competition in today's acquisitions" **NDIA, 15 Jun 10**

… in partnership with commercial and defense industry and their standards developing organizations…

… by revitalizing core SE standard practices suitable for direct cite in DoD contracts with appropriate tailoring…

… to ensure work necessary for a successful program is bid, evaluated, and included in the contract statement of work

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Questions?

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